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ABSTRACT

In 1975, Richard Atkinson's keyword method was formally introduced. He described the method in the context of foreign language learning. However, it has been extended to the learning of other curricular content as well, such as cities, states, individuals and their accomplishments. In the present study, eighth-grade students were presented fictitious passages containing the names and accomplishments of various individuals. In one condition (Pictures), students were shown illustrations in which a keyword was linked to the person's accomplishment. In the other condition (Pictures Plus), additional incidental details were included in the illustration. In comparison to control subjects, both keyword groups recalled substantially more accomplishments of the various people. Pictures Plus students also recalled more incidental information about the people. Moreover, students in both keyword conditions successfully applied the strategy when illustrations were no longer provided. (Author/GSK)

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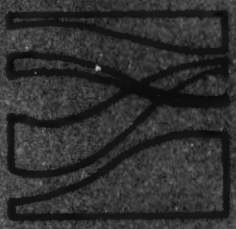

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by

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Report from the Project on
Studies in Language: Reading and Communication

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Abstract

Eighth-grade students were presented fictitious passages containing the names and purported accomplishments of various individuals. In one condition (Pictures), students were shown illustrations in which a "keyword" (a word sounding like part of the person's name) was linked to the person's accomplishment. In the other condition (Pictures Plus), additional supporting details were included in the illustration. In comparison to control subjects, both keyword groups recalled substantially more accomplishments of the various people. Pictures Plus students also recalled more incidental information about the people. Moreover, students in both keyword conditions successfully applied the strategy when illustrations were no longer provided.

Learning About "Famous" People Via the Keyword Method

In 1975, Richard Atkinson gave a shot in the arm to a dying art. The dying art was a mnemonic method that has been passed down through the ages to students of memory (see, for example, Yates, 1966). The shot in the arm was the formal introduction of Atkinson's keyword method which has since been the subject of considerable scientific scrutiny. Atkinson described the keyword method in the specific context of foreign language vocabulary learning. To use the method in this context, the learner must first acquire a "keyword" (a concrete English word that sounds like a salient part of the foreign word). Then, using the keyword, the learner constructs a visual image in which the referents of the keyword and the foreign word's meaning are interacting in some way. For example, the Spanish word carta sounds something like the English word cart (the keyword) and means letter. A picture of, say, a postal letter inside a shopping cart would help the learner retrieve the English meaning of carta. It is safe to say that with few exceptions (cf. Fuentes, 1976; Hall, Wilson, & Patterson, Note 1), the keyword method has proven its worth as an effective foreign language learning strategy with both adults (e.g., Atkinson & Raugh, 1975; Raugh & Atkinson, 1975; Raugh, Schupbach, & Atkinson, 1977; Pressley, Levin, Nakamura, Hope, Bispo, & Toye, Note 2) and children (e.g., Levin, Pressley, McCormick, Miller, & Shriberg, 1979; Miller, Levin, & Pressley, in press; Pressley, 1977a; Pressley & Levin, 1978; Pressley, Levin, & McCormick, in press).

More importantly as far as the present investigation is concerned, the keyword method has been impressively extended to the learning of other curricular content as well, such as cities and their products (Pressley & Dennis-Rounds, Note 3), states and their capitals (Levin, Shriberg, Miller, McCormick, & Levin, in press), and individuals and their accomplishments (Jones & Hall, Note 4). The names-and-accomplishments study of Jones and Hall provided the direct impetus for the research reported here. One of the most distinguishing features of the present study, however, is that the to-be-learned associations were framed within the context of short prose passages, rather than in an unconnected pair format that has characterized all of the research reported to date.

The present study was unique in a number of ways that will now be detailed. First, fictitious accomplishments were paired with people's names that had been drawn randomly from a city phone book. This represents an important challenge to the keyword method because in virtually all of the previous research (including that of Jones & Hall, Note 4), stimulus items were selected on the basis of their being ideally suited to the keyword method.

Second, and as was mentioned previously, students (eighth graders) were presented with the critical information about each person in an actual prose format, rather than in disjoint name-accomplishment pairs. Thus, instead of simply learning Charlene McKune: taught her pet cat how to count, this information was incorporated into a short expository passage.

Third, in addition to the central accomplishment information, each passage included incidental information. Students were not explicitly

instructed to remember the incidental information even though they were tested on it later. This made it possible to determine whether the keyword method, as applied here, facilitated students' acquisition of certain passage facts only at the expense of others.

Fourth, two different pictorial versions of the keyword method were devised to examine the central-versus-incidental-information question more closely. In one version, only the critical name-accomplishment information was pictured. In the other version, both the critical information and the incidental information were pictured. With regard to the latter version, would too many additional pictorial details detract from students' ability to focus on and remember the critical information?

Finally, after half of the name-accomplishment passages were presented, students in the above two keyword conditions were not shown pictures for the remaining passages. Instead, they were instructed to make up their own internal pictures (visual images), along the lines of those that had just been presented. If students could successfully transfer from a fully "imposed" picture keyword strategy to an "induced" visual imagery keyword strategy (Levin, 1976), then a very real educational benefit of the keyword method would be established (see also Pressley & Dennis-Rounds, Note 3).

Method

Subjects

Forty-eight eighth-grade students, selected from a middle to upper-middle socioeconomic area in the midwest, participated in the study. Each student was taken out of a morning study hall for a period of 20-25 minutes.

Design and Materials

Students were randomly assigned in equal numbers to three conditions, to be described below. Twelve passages were constructed, each containing three sentences (mean passage length = 46 words). The first sentence in each passage included the name of a person and what that person was famous for (central information). The second and third sentences contained two statements that served to elaborate upon the central information (incidental information). The content of all passages was fictional and fanciful in order that students' prior knowledge of specific passage content would be minimized. Consider the following passage: Animal owners all over the world are impressed that Charlene McKune has taught her pet cat how to count. The cat can count to 20 without making any mistakes. Moreover, the remarkable cat can do some simple addition. In the first sentence in the above passage, the central information is that Charlene McKune is famous for teaching her cat how to count. Sentences two and three include two pieces of incidental information or supporting details: (a) the cat can count to 20; and (b) the cat also knows how to add simple numbers.

The last names of the persons in the passages were obtained by randomly selecting last names from the white pages in a local telephone directory. First names were obtained separately by selecting equal numbers of male and female names from the same directory.

For control students, copies of the twelve passages were typed double-spaced in Courier 10 type on 5" x 8" (12.7 x 20.3 cm) cards. For students in the two keyword conditions (Pictures and Pictures Plus), a "keyword" was provided for the last name of each person in the passages.

For example, for the name Charlene McKune, the keyword raccoon was used, because raccoon sounds something like McKune. For students in the Pictures condition, a colored line drawing was provided wherein the representation of the keyword was made to interact with the representation of that person's accomplishment. Hence, for the passage where Charlene McKune was famous for teaching her cat how to count, the picture in Figure 1 was displayed. Students in the Pictures Plus condition were presented with the same drawings as those shown to Pictures students, but with one important addition: namely, the inclusion of pictorial representations of the two pieces of incidental information (see Figure 2). Thus, for the

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Insert Figures 1 and 2 about here

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present example, a cat is counting raccoons in both drawings but in the Pictures Plus drawing, the cat's ability to: (a) count to 20, and (b) do simple addition are each illustrated.

Twelve sets of test questions relating to the passages were formulated for students in all conditions. Each set included a central information question (What was Charlene McKune famous for?) and two incidental information questions [(a) How high can the cat count to successfully? and (b) What else can the cat do?].

Procedure

Each student was tested individually in a quiet area off the study hall by one of two female experimenters. Students were given instructions appropriate for their experimental condition, and were told that for

each passage they should try to remember the person's name and his or her accomplishment. Two practice passages with a name-accomplishment question ["What was (person's name) famous for?"] were included in the instructions.

Students in the control condition were told that it would be helpful for them to become familiar with the names of the famous people about whom they would be hearing. They were then given three exposures to a set of twelve 5" x 8" (12.7 x 20.3 cm) cards, on which were typed the names of the persons from the passages. Keyword students were shown cards of the same size on which were typed each person's name and the associated keyword. Keyword students were also given three exposures to the cards--one study exposure where the keyword was provided along with the person's name, and two test exposures where only the person's name was given--and the students were asked to recall the keyword. On the two test exposures, corrective feedback was provided for incorrect responses and omissions (i.e., the experimenter displayed the keyword that was printed on the other side of the card).[1]

Students in both keyword conditions were then told to listen to the experimenter read all the passages, with a 15-sec inter-passage interval provided. For the first six passages (counterbalanced across students), students in these conditions were shown the drawings appropriate for their experimental condition. For the remaining six passages, the students were not shown any drawings, but were asked to make up pictures in their heads (i.e., to construct visual images) modeled after those of the first six passages.

Students in the control condition were provided with typewritten copies of the first six passages to look at while the experimenter read them aloud. For the last six passages, controls listened to the experimenter read the passages, but were not given their own copies to view at the same time. Instead, they were instructed to use their "own best way of learning" for remembering each person's name and that person's accomplishment. These students were also provided with a 15-sec inter-trial interval.

Following the presentation of the twelve passages, all students were given each person's name in a random order different from the initial one, and then asked what that person's accomplishment was. When an experimenter had asked all twelve central information questions, she went back to the first question and provided the answer, regardless of whether or not the student had responded correctly. The experimenter then asked the two incidental information questions associated with the first question. This procedure continued for the remaining eleven passages. Thus, a total of 12 central name-accomplishment questions were asked, followed by 24 incidental information questions.

Results

Central and incidental information scores were determined for each subject. Correct, partially correct, and incorrect answers were agreed upon by two judges who were "blind" with respect to the subjects' experimental conditions. Scores were computed separately for the first six study passages (pictures provided) and the last six study passages (imagery generated) to determine whether either or both versions of the keyword method improved name-accomplishment recall. The results are summarized in Table 1.

Insert Table 1 about here

Four sets of analyses were performed, one for each group of passages (first six or last six) and for each type of information assessed (central or incidental). Dunn's method of multiple comparisons was employed for each set of analyses, based on a familywise Type I error probability of .05 per set (see Kirk, 1968). The mean square within was associated with 45 degrees of freedom in all comparisons.

The results are, for the most part, clearcut. On both the first and last six passages, subjects in the two keyword conditions remembered substantially more central name-accomplishment information in comparison to controls, all ts > 3.02, ps < .01. Moreover, the two keyword conditions did not show mean differences in central information recall, both $|t|$s < 1. Thus, the keyword method increased name-accomplishment recall, regardless of whether students were shown actual line drawings (first six passages) or whether they had to generate their own mental images (last six passages). The percentage increase amounted to about 200% for line drawings, and to over 100% for visual imagery!

When students were shown actual line drawings (first six passages), Pictures Plus students recalled significantly more incidental information in comparison to controls, $t = 3.31$, $p < .01$. Pictures students did not differ from controls in their recall of incidental information, however, $t = 1.16$, $p > .20$; nor were they statistically different from Pictures Plus students at the needed Dunn p of less than .0167, $t = 2.15$, $p < .05$.

On the second six passages, there were no significant differences among conditions in incidental information recall, all ps > .10.

Discussion

The findings of the present study will be discussed in terms of the several issues it addressed. First, it is clear that the eighth graders here experienced considerable recall benefits from the keyword method as applied to name-accomplishment information, even when (a) the names included were not specially constructed for optimal keyword method use, and (b) the name-accomplishment information was embedded in short expository passages. With regard to the latter point: To be sure, the central information leapt out at the students, inasmuch as it was always conspicuously present in the topic sentence of each passage. Nonetheless, prose is prose, and this means of presenting important information to learn (i.e., in the topic sentence) does not appear to be unusual. An interesting followup study would be one in which the utility of the keyword method is assessed when the central name-accomplishment information is obscurely placed somewhere in the body of a lengthy passage. Yet, the present study represents an important initial transition from the learning of unconnected to connected pieces of information.

Students given both keyword variations remembered substantially more central name-accomplishment information in comparison to controls. An especially interesting finding was that students who were provided with additional pictorial details learned as much name-accomplishment information as did students who viewed pictures containing central information only.

What is more, students who viewed more detailed pictures were able to recall more of the incidental details as well. Students who viewed pictures containing only central information did not recall any more incidental information than did control students. A study currently in progress is attempting to determine just how much additional information can be incorporated into a keyword picture before the system deteriorates. That is to say, in the present study Pictures Plus students could successfully cope with two pieces of incidental information. Would they experience any problems (in terms of either central or incidental information recall) if they were required to deal with, say, twice that amount?

Another set of issues focuses on the students' ability to generate facilitative interactive images on their own (i.e., without external pictorial support). Quite clearly, the present eighth graders successfully transferred from a fully imposed picture to an induced imagery version of the keyword strategy. Is prior experience with several actual line drawings a necessary prerequisite for successful transfer? And, although the induced imagery version of the keyword strategy was facilitative, would it be as facilitative as a completely imposed pictorial version of the strategy? Pressley and Dennis-Rounds (Note 3) provide an excellent discussion of this point. Although our data suggest that the effects associated with the induced version were only about two-thirds as large as those associated with the imposed version, firm conclusions about the comparative effects cannot be reached here for at least two reasons. First, it was not the intent of this study to make direct imposed-induced comparisons and, consequently, strategy order was not counterbalanced. That is, the six

imposed picture passages always preceded the six induced ones. Potential proactive and retroactive effects would have to be considered in any meaningful interpretation of the results. Second, students were transferred to the induced strategy with nothing more than an instruction to "try it on your own." Thus, it is not possible to determine how much more successful students would have been had previous practice in imagery generation (and accompanying feedback) been administered. It is safe to say, however, that such imagery generation experience has proven useful in other associative-learning contexts (cf. Levin, 1976; Pressley, 1977b).

It was reported that students in the Pictures Plus condition remembered more of both the central name-accomplishment information and the incidental details, in comparison to control students, when they were shown actual pictures (first six passages). When the pictures were no longer provided and students had to continue applying the keyword strategy on their own (last six passages), the advantage of Pictures Plus students persisted for name-accomplishment recall whereas it disappeared for incidental information recall. This finding is neither disturbing nor surprising, inasmuch as the students here were never explicitly instructed to remember any of the incidental information. The fact that line drawings containing the incidental information facilitated recall of that information--even when the students were not instructed to remember it--attests once again to the potency of content-relevant visual illustrations in prose-learning contexts (Levin, in press; Levin & Lesgold, 1978). At the same time, it might well be the case that with explicit instructions to remember the incidental information in addition to the names and accomplishments, keyword students could incorporate the incidental information into their "pictures", whether these

be line drawings containing the central information (Pictures condition, first six passages) or completely self-generated images (both keyword conditions, second six passages). Available data lend support to this speculation (e.g., Guttmann, Levin, & Pressley, 1977; Levin, Bender, & Pressley, 1979), and the study currently in progress will assess it directly.

Finally, it should be noted that students' execution of the keyword strategy on the second six items was not completely self effected, inasmuch as keywords had initially been provided by the experimenter for all twelve names. Can the successful generation of interactive imagery observed here be extended to incorporate effective keyword generation as well? If so, then students will have indeed acquired a valuable mnemonic tool that can be applied to much of the curricular content that they are required to learn in school.

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Footnotes

[1]In fact, one-trial recall of all 12 keywords was achieved by most students.

Table 1

Mean Percentage of Information Recalled, by Experimental Condition

	Control	Pictures	Pictures Plus
	Central information		
First six passages[a]	29.2	88.0	83.3
Last six passages[b]	31.2	69.8	62.5
	Incidental information		
First six passages[c]	51.8	60.7	77.1
Last six passages[d]	51.0	62.0	59.4

[a] $\underline{MS}_E = 351.67.$

[b] $\underline{MS}_E = 853.06.$

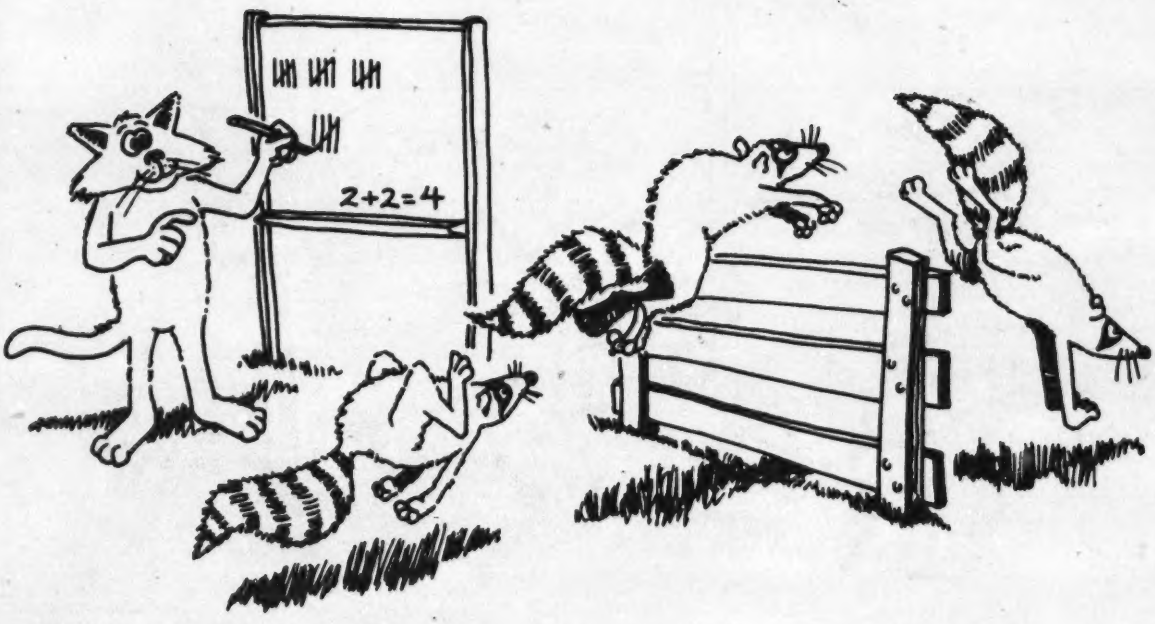
[c] $\underline{MS}_E = 464.44.$

[d] $\underline{MS}_E = 448.19.$

Figure Captions

Figure 1. Illustration shown in the Pictures Condition.

Figure 2. Illustration shown in the Pictures Plus Condition.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